CLAIMS

1. A microfluidic system, in particular in a cell sorter, with
   - a first carrier flow supply line (1) for supplying a first carrier flow with particles (4) suspended therein,
   - a first carrier flow output line (15) for withdrawing at least a part of the carrier flow with the particles (4) suspended therein,
   - a process chamber (3) for examining, observing, manipulating and/or selecting the particles (4), in which the first carrier flow supply line (1) opens into the process chamber (3) while the first carrier flow output line (15) is discharged out of the process chamber (3),

   characterized by
   - at least a second carrier flow supply line (2) for supplying a second carrier flow with particles (5) suspended therein, the second carrier flow supply line (2) also opening into the process chamber (3).

2. The microfluidic system according to Claim 1, **characterized by**
   - a first measuring station (9) for examining the particles (4) suspended in the first carrier flow, and
   - a second measuring station (10) for examining the particles (5) suspended in the second carrier flow.

3. The microfluidic system according to Claim 1 or 2, **characterized in that** the first carrier flow and the second carrier flow run adjacent to one another in the process chamber (3) at least in an examination area located upstream.

4. The microfluidic system according to Claims 2 and 3, **characterized in that** the first measuring station (9) is arranged in the examination area of the process chamber (3) in the area of the first carrier flow whereas the second measuring station (10) is arranged in the examination area of the process chamber (3) in the area of the second carrier flow and adjacent to the first measuring station (9) as regards the direction of flow.

5. The microfluidic system according to Claim 3 or 4, **characterized in that** a dividing wall (8) is arranged in the examination area of the process chamber (3)

between the first carrier flow and the second carrier flow, the dividing wall (8) being impermeable for the particles (4, 5) and/or for the carrier flows.

6. The microfluidic system according to any one of Claims 3 to 5, **characterized in that** a dielectrophoretic field cage (12) is arranged in the process chamber (3) in order to fix the particles (4, 5).

7. The microfluidic system according to Claim 6, **characterized in that** the field cage (12) is arranged downstream behind the first measuring station (9) and the second measuring station (10).

8. The microfluidic system according to Claim 6 or 7, **characterized in that** the field cage (12) is arranged in the process chamber (3) substantially in the middle between the two carrier flows.

9. The microfluidic system according to any one of Claims 6 to 8, **characterized in that** a selection unit (11) is arranged in the direction of flow between the measuring stations (9, 10) and the field cage (12) that selects certain particles (4, 5) from the first carrier flow and/or from the second carrier flow and supply lines them to the field cage (12).

10. The microfluidic system according to any one of Claim 6 to 9, **characterized by** a third measuring station (13) for examining the particles fixed in the field cage (12).

11. The microfluidic system according to any one of the preceding claims, **characterized in that** at least one centering unit (6, 7) that centers the particles (4, 5) is arranged in the first carrier flow supply line (1) and/or in the second carrier flow supply line (2) and/or in the process chamber (3).

12. The microfluidic system according to any one of the preceding claims, **characterized in that** at least one holding unit (18, 19) that holds the particles (4, 5) is arranged in the first carrier flow supply line (1) and/or in the second carrier flow supply line (2) and/or in the process chamber (3).

13. The microfluidic system according to any one of the preceding claims, **characterized in that** at least one second carrier flow output line (16) is discharged from the process chamber (3).

14. The microfluidic system according to Claim 13, **characterized in that** a sorting unit (14) is arranged in the downstream area of the process chamber (3) that sorts the particles (4, 5) onto the first carrier flow output line (15) or onto the second carrier flow output line (16).

15. The microfluidic system according to Claim 14, **characterized in that** the second carrier flow output line (16) is discharged in a flow line behind the field cage (12) from the process chamber (3) whereas the second carrier flow output line (15) is discharged from the processing chamber (3) in a laterally offset manner.

16. The microfluidic system according to Claim 15, **characterized in that** a third carrier flow output line (17) is discharged from the process chamber (3), wherein the third carrier flow output line (17) being discharged from the process chamber (3) laterally offset opposite the flow line behind the field cage (12).

17. The microfluidic system according to any one of Claims 9 to 16, **characterized in that** the centering unit (6, 7), the sorting unit (14), the selection unit (11) and/or the holding unit has a dielectrophoretic electrode arrangement.

18. The microfluidic system according to any one of the preceding claims, **characterized in that** a holding unit (20) is arranged in at least one of the carrier flow output lines (15, 16, 17) in order to intermediately store the particles (4, 5) in the output line (16).

19. A cell fusioner with a microfluidic system according to any one of the preceding claims.

20. The cell sorter with a microfluidic system according to any one of the preceding claims.

21. An operational method for a microfluidic system, especially according to any one of Claims 1 to 18, with the following steps:

- supplying of a first carrier flow with particles (4) suspended therein by a first carrier flow supply line (1) into a process chamber (3) of the microfluidic system,
- examination, observation, manipulation and/or selection of the particles (4) in the process chamber (3),
- discharging of at least a part of the first carrier flow with the particles (4) suspended therein via a first carrier flow output line (15),

characterized by the following step:

- supplying of at least a second carrier flow with particles (5) suspended therein by a second carrier flow supply line (2) into the process chamber (3).

22. The operational method according to Claim 21, **characterized by** the following steps:
    - examination of the particles (4) suspended in the first carrier flow, and
    - examination of the particles (5) suspended in the second carrier flow.

23. The operational method according to Claim 22, **characterized by** the following step:
    - selection of the particles (4) suspended in the first carrier flow or of the particles (5) suspended in the second carrier flow as a function of the examination of the particles (4) suspended in the first carrier flow and/or as a function of the particles (5) suspended in the second carrier flow.

24. The operational method according to Claim 23, **characterized by** the following step:
    - fixing of the selected particles (4, 5) in a dielectrophoretic field cage (12).

25. The operational method according to Claim 24, **characterized by** the following step:
    - examination of the particles (4, 5) fixed in the field cage (12).

26. The operational method according to one of Claims 21 to 25, **characterized by** the following step:
    - sorting of the particles (4, 5) onto one of several carrier flow output lines (15, 16, 17).

27. The operational method according to Claim 26, **characterized in that** the sorting takes place as a function of the examination of the particles (4, 5) fixed in the field cage (12).

28. The operational method according to any one of Claims 21 to 27, **characterized in that** the examination of the particles (4) suspended in the first carrier flow and/or the examination of the particles (5) suspended in the second carrier flow and/or the examination of the particles (4, 5) fixed in the field cage (12) comprise(s) a transmitted-light measuring and/or a fluorescence measuring.

29. The operational method according to any one of Claims 21 to 28, **characterized in that** the centering unit and/or holding unit arranged in the first carrier flow supply line on the one hand and the centering unit and/or holding unit arranged in the second carrier flow supply line on the other hand are controlled in a time-coordinated manner.